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Article

Meeting Young People's Mobility and Transport Needs: Review and Prospect

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Abstract: This paper reviews published and grey literature on young people's daily transport and mobility experiences and potential, with the aim of identifying major research gaps. It draws on literature across a range of disciplines where interest in mobilities has expanded significantly over the last decade (transport studies; social sciences, notably geography and anthropology; health sciences). We focus particularly on young people from poorer households, since poverty and mobility intersect and interact in complex ways and this needs closer attention. Although youth transport issues are set in their global context, the focus on poverty encourages particular attention to low- and middle-income countries (LMICs), especially countries in Africa and Asia. Key themes include education, employment, travel safety and the role of mobile technology. This review demonstrates how young people's travel experiences, needs and risks are embedded in power relations and vary with gender, age and location. It also points to the scale and range of uncertainties that so many young people now face globally as they negotiate daily mobility (or immobility). Significant research gaps are identified, including the need for more in-depth action research involving young people themselves (especially in Asia), and greater attention to the impact of mobile technologies on travel practices.

Keywords: children; mobility; transport; Africa; Asia; youth voice; school; work; road safety

1. Introduction: Young People's Mobility and Transport in a Rapidly Changing World

Young people remain a remarkably neglected constituency in the world of transport planning globally (with the exception of road safety), despite the vital importance of their access to education, health and other services for our future progress and for sustainable development. This omission is of particular concern in the many low- and middle-income countries (LMICs) where well over half the population is under 30 years old and, in some, over half the population is under 18 years old. Two particularly pertinent trends for the discussion that follows are expanding urbanisation and expanding youth populations. It is estimated that by 2030, 60 percent of the world's population will live in cities and that 37 percent of the world's population will be under the age of 20 [1]. There will be 1.3 billion young people aged 15–24 years by 2030 globally [2]. Given the size and importance of the youth constituency, and growing concerns around the potential political risk implied, especially by large concentrations of un/underemployed youth living in cities, young people's transport and mobility needs require urgent attention from policy makers.

Access to services and facilities has massive implications for young people, not only in terms of their current wellbeing but also for their livelihood potential and life chances. The importance of transport for urban young people is specifically recognised in Sustainable Development Goal (SDG) 11.2: provide access to safe, affordable, accessible and sustainable transport systems...with special attention to the needs of those in vulnerable situations (specifically including children). However,

better access to mobility/transport will be crucial to achieving almost all the Sustainable Development Goals: in particular, SDGs 3, Good health and wellbeing, 4 Quality education, 5 Achieve equality and empower women and girls, 8.5, Full and productive employment and decent work for all...including for young people, and 8.6, Substantially reduce the proportion of youth not in employment, education or training. It is unlikely that current inter-generational cycles of poverty can be effectively broken without significant, sustained attention to the mobility of young people and their access to transport worldwide.

This paper reviews the available published and grey literature on young people's daily transport and mobility experiences and potential in order to identify major research gaps. The review draws on the authors' extensive personal knowledge of published and grey literature in this field (in which both have been active participants since the 1990s), searches in the international transport/mobility journals (for instance the *Journal of Transport Geography*, *Transport Policy*, *Transport Reviews*), child and youth-focused journals (for instance *Children's Geographies* and *Children, Youth and Environments*) and Google Scholar, plus Web-of-Science searches undertaken for the period 2000–2019 using the following search terms: Young people/Children/Youth AND Transport/Mobility AND Africa/Asia/Latin America. Overall, references in Web-of-Science are far fewer for Asia than for Africa and even fewer still for Latin America: for instance, a search on Young people AND mobility AND Africa produces 63 references, but only 19 for Young people AND mobility AND Asia (and just 8 for Latin America); Children AND mobility produces 176 references for Africa, 62 for Asia and 28 for Latin America. Literature specifically focused on young people with disabilities was reviewed separately in a companion paper by Maria Kett.

There is insufficient space to review wider mobilities associated with migration in this paper: the focus is specifically around the daily mobilities that shape young people's access to education, work and general well-being. Similarly, space precludes consideration of the substantial evidence regarding the importance of transport services for the health of children and young people beyond the traffic accident issues noted in this paper. Consequently, the impacts of transport and mobility on vaccination, maternal health, access to TB, malaria and eye treatment, ARVs and sexual and reproductive health are not included here. Similarly, the effects transport and road infrastructure have on health professionals' decisions regarding work place selection are also omitted. These latter (health-related) topics have been covered in other publications of the first author, who has undertaken field research and published widely in the field of daily mobility, transport and access to services for vulnerable populations in Africa since the late 1970s and with specific reference to children and young people since 2000.

The paper draws on literature from a diversity of disciplines, extending from transport studies and health sciences through to the social sciences (notably geography and anthropology) where interest in mobilities research has expanded significantly over the last decade. Where possible, the spotlight throughout is on young people from poorer households, since poverty and mobility intersect and interact in complex ways and this needs far closer attention. Youth transport issues are set in their global context but with particular reference to LMICs, especially countries in Africa and Asia. Africa is the focus of particular attention in this paper because it is demographically the world's youngest continent: by 2050, the estimated number of young people entering the labour force in Africa will exceed that of the rest of the world combined [3]. This fact may help explain why there is a more extensive published and grey literature pertaining to Africa than to Asia.

The paper addresses seven topics, the first of which briefly explains the specific age focus of interest, while the following six topics represent key aspects of recent research/debate that can be drawn from the literature reviewed here:

- Age categories/definitions: Age groups commonly considered under the 'young people' heading, with particular reference to those age groups commonly incorporated into policy discussions on young people and transport.
- Youth voice: Young people in governance and decision-making and their roles as actors in the wider development arena, with particular reference to the transport sector and the potential to promote their voices in transport planning and policy.

- Education: Transport and the education sector (including affordability, student discounts on urban informal public transport, harassment).
- Employment: Transport as youth employment and associated space for entrepreneurial and innovative practices; transport as employment and entrepreneurial constraint.
- Safety: Road safety and other aspects of young people's personal mobility safety.
- Mobile technology: The interaction between mobile technology and travel among young people (with particular reference to its potential to aid delivery of youth-equitable urban transport services).
- Gender: Mobility is relational—it is embedded in power relations—and gender, like age, is a critical shaper in this respect. Attention is paid throughout to gender as a critical cross-cutting factor shaping the transport and mobility experiences of the focus age groups in this review.

2. Age Categories/Definitions: Who Is Included in the Category 'Youth' and 'Young People'?

Various terms are used when identifying young people—'child', 'young person', 'youth'. Formal definition of these terms may vary according to a country's legal code or to a particular institution/agency's decision, but it is also often informally shaped by cultural context: all these categories are, in essence, social constructs. The papers reviewed below adopt varying age definitions when talking about children and youth so it is not possible to work with any one specific definition. We note, however, that childhood is commonly associated with the period prior to puberty, while 'youth'—particularly in papers with an African focus—now often includes reference to people well into their 30s. This accords with the fact that growing levels of unemployment in Africa and the cost of setting up an independent household are putting many young people into an increasingly prolonged period of dependency [4,5].

3. Youth Voice

Young people's role in governance and decision-making globally is small but it is beginning to expand rapidly, associated with a growing recognition of the potential political risks associated with their unmet needs. An increasingly vocal mass of youth is drawing on its expanding expertise in social media to help build extensive communities of interest and promote its growing demands for better representation in governance, whether in local, national or international contexts, and this is well characterised by youth usage of social media in the 'Arab spring'. Youth parliaments, mushrooming across the world (for instance, in India from 2002; African Youth Parliament of 50 countries from 2003 onwards, etc.), are a good example of the efforts currently being made to support and enhance youth voice.

In the transport planning sector, across the globe, young voices have played only a very small part to date (perhaps in part because transport planning has been seen largely in terms of motor-mobility and young people are usually not legally allowed to drive until their mid/late teens) [6]. However, demands for social inclusion and mobility justice are growing [7,8]. Even in those rare cases where transport has been planned with attention to youth needs (mostly in developed country contexts), it has very rarely been planned with youth. Participatory planning has mostly been viewed by officialdom as a process of engagement with adults. However, given increasing recognition of the need for policy change towards low-carbon sustainable transport (more emphasis on public transport, cycling and walking), youth transport strategies that directly engage with the youth of today will be of vital importance: new travel behaviours are more likely to be learned and adopted by young people [9].

The (albeit very limited) literature available shows how young people can provide vital understanding of their transport challenges (which may be inaccessible to adults) and have valuable insights into how these can be best addressed [10]. In LMICs, what appears to have been the first participatory research with children and young people (aged 9–18 years) on transport issues started in 2004 with pilots in India, Ghana and South Africa, followed by a major study across 24 sites in Ghana, South Africa and Malawi. This incorporated in-depth qualitative research taking an ethnographic

approach plus an extensive survey (N = 3000) [11–16]. The research went beyond adults simply asking young people for their views on transport issues. In the first place, it involved training 70 school children (aged 11–19 years) as co-researchers to identify key issues and questions, mostly through in-depth interviews, photo-diaries and small surveys with their peers. This study, which was followed up by a further phase of academic-led qualitative and quantitative research in each site, drawing on the key issues and questions raised by the young co-investigators, has arguably enabled a much stronger understanding of significant daily mobility issues affecting young lives than might have been achieved through a conventional academic research study alone.

Subsequently, there has been a slow turn towards promoting young people's voices in the transport sector in LMICs through the adoption of participatory approaches, including Simpson and Collard 2019 [17]. However, the constraints which tend to minimise poorer women's voices (not least supposed lack of competence to contribute to what is perceived as the domain of middle-class male engineer experts) continue to play an even stronger role globally in the case of children and young people [14,18,19].

4. Education: Making the Journey to School

There is substantial literature around the journey to school in the Global North but much less work in the Global South. In the Global North, focus has moved from road safety to expanded attention to the decline in children's independent mobility associated with increasing car use and growing concern with child obesity and the need to expand young people's active travel (walking and cycling) [20–22]. A similar trend can now be observed in the Global South [23]: among middle-class urban children, obesity issues are also emerging, with clear linkages to the expansion of motor transport usage for school journeys [24–27]. In China, in particular, the one-child policy encouraged many parents to adjust their life patterns to provide better education for their children, including chauffeuring their children to and from school if they could afford to do so [28]. In a Nairobi context, parental perception of positive neighbourhood social cohesion, positive environs and connectivity, all of which reduced their child safety concerns, encouraged positive child physical activity outcomes [29]: these factors are likely to be pertinent in many LMIC urban contexts [30]. While programmes in many developed country cities now promote the idea of 'walking school buses' and 'bicycle trains', in order to encourage more active travel [1,31], in LMICs, these are much rarer, although there have been experiments, notably in South Africa and Dar es Salaam [32].

Travel to school experiences in LMICs, especially among children from lower-income families, tend to differ substantially from the norm prevailing in many countries of the Global North (where parental escorting of younger children to school is common and private motorised transport often dominates) [33]. In many LMICs, escorting is mostly a task assigned to older siblings and the journey is far less likely to involve private transport. For children from poorer households, in particular, challenges around physical access to school are closely aligned with issues of journey time and distance—in Africa, mostly entirely conducted through pedestrian travel, in Asia by either walking or cycling—and its associated dangers [14] (chapter 3) [34]. Information per se—and particularly qualitative information—on school travel experiences is far more extensive for African than Asian contexts where, in recent years, the focus has been principally on analysing large-scale survey data. Consequently, Africa dominates the following discussion.

4.1. Travel from Rural Homes to Schools and Training Opportunities in Urban Centres

Globally, secondary schools, further, and tertiary education are likely to be located in urban centres, restricting opportunities for skills development and the take-up of learning and training opportunities in more remote rural areas [35]. Transport and travel are likely to play a crucial 'cause and effect' role in exacerbating poor skills and low productivity, especially in contexts where transport density is low and subsidised transport is unavailable. In rural Africa, where transport availability is much sparser and more costly than in Asia, the impacts are particularly significant [36]. Thus, in Ghana, it has been

observed that the closer the secondary school, the more likely that children are sent to primary school, as continuity of the child's education is feasible [37].

Across sub-Saharan Africa, children will be seen trudging each early morning and mid-afternoon along major highways as traffic hurtles past. Such long daily walks to and from school due to lack of or high cost of transport bring attendant problems of lateness and encourage late 'over-age' enrolment (especially of girls), truancy and early drop-out. The common alternative of 'home boarding' in town (renting a room alone in the absence of sufficient cheap school boarding places) is particularly fraught with dangers for young girls, who are often targeted for sex by predatory older men [14]. Data from the 2003 South Africa National Household Travel Survey indicates that just over three-quarters of 'learners' walked to school and just under one fifth of the 16 million total spent over one hour each day walking to and from their schools, which are commonly located in smaller or larger urban centres [38].

In remoter locations of rural Asia, poverty similarly forces many pupils to walk to school, despite the greater availability of regular transport than in most of sub-Saharan Africa. In such circumstances, in Bangladesh, Matin et al. [39] described how it is the norm for such children to walk in groups to school for safety reasons, just as they do in Africa. Unsurprisingly, parents in India, Thailand and China are reportedly more likely to allow girls to carry on with their education where transport services are reliable and safe [40]. In Delhi, India, where sexual harassment on public transport is now a notorious issue for women, a correlation has been found between young women's college choice and their perceptions of route safety, despite the higher transport fares thus involved (though without evidence of direct causal connection between the two [41]).

It is also important to note that the performance of children and young people at school or in training programmes may be shaped by transport constraints at home. Such transport failures, particularly (but not only) in rural environments, may require young people to undertake a series of tasks before they leave for school or after they return home: these commonly include carrying water and (less regularly) firewood, together with other domestic work such as cleaning, sweeping, washing clothes and caring for younger siblings [42].

4.1.1. School Travel within LMIC Urban Areas

Within LMIC urban areas, motorised transport is available, but fare costs limit its use by school pupils. This is a major factor shaping the very heavy dependence on pedestrian travel (together with bicycle travel in Asia). In urban Africa, generally well over 90% of pupils travel to school on foot: 96% in a Nairobi slum according to Salon and Gulyani [43], 98% across eight diverse Ghana sites and 99% across eight diverse Malawi sites studied by Porter et al. [14] (chapter 3). Journey times can be far more substantial than in Asia given such high levels of dependence on pedestrian travel and the low availability of cycles to school pupils [14] (chapter 3). In peri-urban neighbourhoods in Ghana, Malawi, South Africa and Kenya, pupils report walking considerable distances, especially where there is a preference for a (usually better) school, or where the nearest schools are full [14,43]. In Soweto-Johannesburg, for instance, over a third of primary-school-aged children were found to travel more than 3 km one way to school, nearly two-thirds attended schools outside of the suburb where they resided, and only 18% attended the school closest to home [44]. School quality considerations are often a significant factor shaping school selection, even among relatively poor households. See also Hunter's research in Durban [45]; he makes the point that this applies to poor—but not the poorest—households.

In urban Asia, the sparse published material available suggests that school pupils make more substantial use of informal public transport and of bicycles. However, as cities expand in Asia, the school commuting distance is inevitably growing, as Li and Xhao and Zhang et al. showed using data from Third and Fifth Travel Surveys of Beijing Inhabitants, respectively (with some children travelling over 5 km) [28,46].

4.1.2. Hazards of School Travel

Walk-along interviews with pupils are particularly powerful in demonstrating the fear of harassment and attack for both boys and girls that are widespread in low income urban and rural neighbourhoods, as Porter et al. showed for Ghana, Malawi and South Africa [47]. See also Phillips and Tossa 2017 [48] for child-led walks in Thailand. Overall, children from particularly deprived neighbourhoods tend to face the most constraints on their movement, as Adams et al. observed in a study across urban and rural neighbourhoods in Western Cape [49]. But even in somewhat less deprived neighbourhoods, children's mobility can be restricted by diverse factors, as Benwell pointed out with reference to baboon troops, domestic 'guard' dogs, traffic and the impact of family composition in suburban Cape Town [50].

Across LMICs, the wider hazards of school travel by motor transport are numerous, whether dedicated school transport or informal public transport is utilised: overcrowded poorly maintained vehicles without seatbelts are driven by poorly trained drivers over poorly maintained roads. The situation is no different today across most of Africa and South Asia than was observed in rural Brazil two decades ago [51]. However, in South Africa, where the Safe Travel to School Programme was recently implemented by a national child safety agency, there have been some indications of improved practice [52]. This has stemmed from a focus on driver road safety awareness, defensive driver training, eye-testing, vehicle roadworthy inspections with selected upgrades, incentives for safe performance, and implementation of a vehicle telematics tracking system with regular, individual driving behaviour information updates.

4.1.3. Subsidised Pupil Travel

Subsidised transport for pupils, as an effective policy measure to increase access to education, is far less widespread in LMICs than in the Global North and seems unlikely to advantage them significantly in practice in many locations. Pupil reports in Cape Coast, Ghana, of being forced off the bus when seats are needed for full-fare passengers are unlikely to be unique. In Dar es Salaam, where, under a government scheme, children pay 33% of the adult fare (but without compensation arrangements to operators), children are often unable to even board the bus in the first place, being barred by the conductors [53]. Similarly, they face exclusion from buses in Karachi because of the requirement there to charge only half-fare [54]. However, across the globe, pupil transport subsidy remains a sensitive, complex issue [55].

4.1.4. Gender Issues in School Travel

Girl pupils face even higher transport constraints and hazards than boys in LMICs and this contributes to girls' lower school enrolment rates. A review in Niger utilizing DHS surveys noted that only 41 girls per 100 boys were at school in rural areas (as opposed to 80:100 in urban areas), and pointed to distance to school as a key factor behind this difference [56]. Improved road access and associated availability of transport appear to have the potential to improve girls' school attendance significantly in some contexts. In Morocco, assessment of a major road programme (National Rural Roads Program (NRRP-1)) entrusted to the National Highways Authority showed that the probability of girls' attendance at primary school increased by 40% with the opening of a paved road [57–59]. Road improvements in Asia appear to have similarly improved girls' access to education, even more than boys, as Mohsin et al. showed for Bangladesh, and Pilgrim and Chanrith for Cambodia, in the latter case with benefits seemingly accruing principally following improvements to a provincial road and a national road as opposed to purely local rural roads [60,61].

The negative impacts of distance, coupled with poor transport, on rural girls' education in Africa and South Asia can be related to a number of factors: girls' heavy household duties (typically heavier than boys' duties); negative cultural perceptions concerning female mobility and girls' education; also perceived dangers for girls who travel a long way to school or alternatively must board far from home

in the school neighbourhood (as noted above) [14,62]. The safest travel procedure in African rural and urban contexts, especially for girls, tends to be to walk together, as a group. However, when there is heavy traffic on urban streets and no separation of pedestrians from motorised transport, such group walks have the potential to cause traffic accidents [14] (Chapter 7). The first cause of death among children aged 5–14 years and young adults 16–29 years is road traffic injury [63] (a point further discussed in the Road Safety section below). Data for low income countries are inadequate but the limited data available indicate that the vast majority of young people in such environments are pedestrians rather than passengers in motor vehicles when they are injured [14].

Even where regular transport is available (mostly in urban contexts), its cost and the potential for harassment tends to impact more strongly on (usually less well resourced) girls [14]. To date, there is less research on gendered patterns of school travel in Asian contexts but survey data from Kanpur City, India, suggests that girls are less likely to travel independently than in sub-Saharan Africa: they are either dropped off from personal vehicles by richer families or accompanied by mothers in families without such transport [64].

Cycles play a relatively small role in school travel scenarios across much of Africa, in particular, and there is much evidence across Africa and Asia to show that critical mass is essential to their widespread use, especially among girls [65,66]. Increasing emphasis on low-carbon transport may help future efforts to promote cycling to school (crucially, if accompanied by training on cycle riding and repair). However, if girls are unable to attend school because of the demand for domestic portage, as is often the case in Africa, broader Intermediate Means of Transport (IMT) interventions such as push carts aimed at the family may be of greater significance. In Pakistan, a World Bank pilot offered a stipend to girls living a long way from the nearest school [67]. Another initiative which could help protect children against harassment and rape is the development of a ‘walking bus’ (whereby adults chaperone children along a set route, acting as driver and conductors), if this is adapted to local context [32].

5. Youth Employment: Transport to Work and Transport as Work

On average, unemployment is likely to be three times higher for youth than for adults globally, but five times as likely among youth as among adults in South Asia and South-East Asia [68]. Even in situations where open unemployment among youth is relatively low, as in most low income countries in sub-Saharan Africa, there is much ‘working poverty’: temporary, low-paid work in the informal sector with poor working conditions [69,70]. Transport’s relationship with youth employment has two significant components which are explored in this section: firstly, its role in getting young people to work places (whether places of employment or places where they are building their own enterprise), secondly, with regard to employment within the transport sector.

5.1. Transport to Work

Firstly, with regard to accessing employment opportunities (whether provided by others, or of their own making, as, for instance, in the case of much petty trade), young people in both rural and urban locations face considerable challenges. Transport availability, reliability and cost are key factors shaping young people’s access to employment. In LMIC rural areas, where employment outside agriculture is often seen as key to improved incomes, accessing non-agricultural employment tends to require long daily journeys to the nearest urban centre. In Western Kenya, this has led to the depressing picture of rural youth ‘tarmac’, as young men trudge along pot-holed (tarmac) roads from rural areas to the city in search of work and back again home when they cannot find employment [71].

Even in urban areas where transport availability is much higher, the distance from affordable suburban dwellings to central employment areas (including potentially more lucrative trading locations in the case of young entrepreneurs) can be a particular challenge for young people in poor households. This is a factor that affects poorer young people’s access to work opportunities in cities across the globe [72], but in LMIC cities, transport constraints are often particularly limiting. There, the urban poor

often live in unplanned settlements and slums on the periphery of cities while employment densities are commonly greatest within the central area. Transport systems (including road infrastructure, formal or informal motorized transport, and non-motorized transport) linking to these opportunities are often extremely congested, unreliable and unsafe [1]. In cities such as Lagos and Manila, journeys from periphery to the city centre can take hours, especially in wet weather when transport demand everywhere increases and potholed roads become impassable. Moreover, the informal para-transit that dominates motorised travel in such contexts is simply unaffordable for the very poor. Unsurprisingly, many young women run small businesses from their own home, at least in part so that they do not have to travel out of the home to work.

In South Africa, poor access to transport is one of a complex mix of factors that results in young people actually stopping actively searching for work. When they leave school, they may have high hopes of finding good employment, but such dreams tend to be quickly dispelled as job applications fail. 'Actively discouraged' youth not seeking work is estimated at 61 per cent in the 20–24 years cohort: a response to feelings of hopelessness and despair [73]. Elsewhere in sub-Saharan Africa, where the informal sector is much larger and there are no social grants, most young people tend to continue to search for work and to take on whatever tasks they can find because, as is so accurately observed by Filmer et al., 'most Africans simply cannot afford to be idle' [69] (p. 3). This comment also applies to many Asian contexts. However, Jeffrey's observations in a north Indian city, where neoliberal economic change had cut back employment opportunities for educated (lower-) middle class young men, suggest conditions somewhat reminiscent of South Africa [74].

In studies of urban transport provision in 1990s Accra, which included specific consideration of its impact on young people, Grieco et al. and Turner and Kwakye, showed how the falling off in transport provision associated with the economic reform measures in place at that time (increased cost of vehicles and spare parts due to devaluation raising the cost of imports, etc.) actually increased dependence on the work of young women and children [75–77]. Children had become increasingly central to the economic organisation of households and would be taken in as foster-children to reduce the transport stress of middle-aged adults faced with transport under-provision: they acted as domestic anchors, compensating for the absence of adult household members delayed in distant markets by transport problems. Additionally, children experienced high levels of local mobility due to domestic tasks required of them, such as refuse removal, water and fuelwood collection and other activities including petty trade. Such conditions still prevail in Accra and probably also in many other African and Asian cities where traffic congestion is high and transport provision poor. Sibling care, especially in AIDS-affected households, adds to the pressures faced by many girls across LMICs [78].

5.2. Transport to Work for Young Women

For young women living in the poorer households of LMICs, conditions are often particularly difficult in the absence of appropriate inexpensive and timely transport, as Venter et al. demonstrated for rural South Africa and Esson et al. for Accra, urban Ghana [70,79]. Cultural barriers to mobility vary (see Kjeldsberg et al. regarding variations in rural Nepal [80]) but for some young married women, these barriers can be insurmountable, especially if they cannot find reliable transport for their return journey home. This tends to be particularly important because of consequent delays to evening meal preparations, possibly coupled with male suspicions of the reason behind their delay. The *unreliability* of transport is a common but under-reported factor constraining young women's trade and entrepreneurial aspirations in both rural and urban sub-Saharan Africa [81,82]. This uncertainty/unpredictability may encompass not only concerns about how long the journey may take, but whether the journey can be done at all. Moreover, it can as significantly affect the young urban woman trying to establish a regional trading business in farm produce or fish as the rural woman hoping to sell her perishable plantain or cassava at a city market. Uncertainty with regards to the transport of the perishable foods that so often underpin young women's early efforts to build a trading business can have a particularly stultifying impact on emergent entrepreneurship.

In urban areas, women often must forego potential travel to find and engage in work because males in their households have first priority on sparse funds for transport fares. Young women are more likely to be unemployed and, if they manage to find work (whether working for someone else or in their own enterprise), walk to their place of employment or undertake this work from their own home. The work tends to be predominantly in very low-paid service-related informal sector jobs. Globally, there is a tendency for women to focus on more local (often less well paid) employment opportunities in their neighbourhood because of the financial costs (and also often the time costs, given family caring demands) [83]. This is particularly evident in LMIC cities such as Nairobi [43], Accra [70], Delhi [84] and Tunis (author fieldwork, 2019). As Langevang and Gough emphasised with reference to Accra, it is important to reflect on young people's movements as tactics of social navigation, recognising the importance of spatial mobility to young people's everyday well-being and their processes of social becoming [85].

In some better-provisioned cities in China, both women's and men's journeys for employment are seemingly less arduous. In Shanghai, for instance, only a small percentage of work journeys (13.0%) are longer than 60 min [86]. However, there, the dominantly residential zones are associated with service jobs and it is likely that women's work will predominate in such contexts. Poor access to education among girls and women in many low-income contexts meanwhile limits their ability to read maps and bus information so they unsurprisingly feel safer working close to home, as has been described in both southern Ghana and Buenos Aires [87,88].

5.3. Young People's Employment in the Transport Sector

In LMICs, the transport sector often provides an employment niche for the poorest, including young people. In both rural and urban areas, inadequate or costly transport can encourage adults to look to children to fill the 'transport gap'. This dependence on youth portering, which can contribute substantially to children's time poverty and deficiencies in schooling, is still regularly overlooked in both transport and education research. There is still insufficient detailed information about children's work as load carriers apart from studies of the 'kayayoo' girl porters in Accra, Ghana [76,89] and the research referenced earlier conducted with young people 9–18 years across 24 urban and rural sites in sub-Saharan Africa, which incorporated research on load-carrying and its (negative) impacts on education and well-being [14] (chapter 4) [42].

Employment in the transport sector is highly gendered across LMICs. Beyond their mid-teens, boys rarely carry (nor are they expected to carry) loads in domestic contexts (e.g., water carrying for the household): this is considered work for women, girls and young boys [14,90]. Portering of goods for commercial purposes is a different matter and many young men also work as push truck operators, as, for instance, in Ghana's urban market centres, usually for very low returns [75]. Other work in the transport sector involving motor vehicles, by contrast, is widely perceived across the LMICs as belonging firmly within the masculine domain. There is occasional publicity around women taxi drivers such as Ghana's MissTaxi [91] and India's motorbike taxi service Bikxie [92] but these are extremely rare, not least due to perceived safety and security issues where women operators are concerned.

For many young men in Africa and Asia, it is the motorcycle or tricycle taxi which has become the most important employment opportunity in the transport sector. Operating a motorcycle-taxi (known as *boda-boda* in much of East Africa, *okada* in much of West Africa) can offer them a relatively lucrative livelihood, whether as independent riders or, more commonly, through a renting arrangement with the motorcycle owner (usually an older, better resourced man or woman). Young men are, in some cases, demonstrating significant entrepreneurship as they move out of less lucrative activities (for instance, charcoal production in Kibaha district, Tanzania) and into motorcycle taxi operations. However, negative impacts are widely reported in some regions: these may include not only reckless driving and increased accident rates, but also violent crime and expanded sexually transmitted diseases (STDs). The latter is, in part, a product of relatively high incomes and consequent high bargaining

power for sex, as noted early in their expansion by Nyanzi et al. for south-west Uganda [93] and Waage for Ngaoundere, Cameroon [94]. In rural areas of Lao PDR, Doussantousse et al. similarly found that motorbikes and mobile phones had expanded the sexual territory of indigenous youth at a time when international commerce and a cash economy along improved highways were bringing new people into the region [95]. Among the concerns for their health and safety are at-risk behaviours involving alcohol and sexual practices, especially HIV and sexually transmitted infections. Such issues have led to much government concern, such that, in Ghana, motorcycle-taxis are still banned nation-wide and many countries have city-centre bans in place. However, such bans do not take into account the crucial level of access that motorcycle taxis deliver for people in informal and peripheral urban areas, such as the satellite towns around Abuja in Nigeria. There, the personal mobility they deliver to young people wanting to be independent is widely appreciated not only by young men but also by the many young women passengers who use them extensively (author fieldwork 2019; see also Adamu regarding the impact on northern Nigerian women of *shari'a*-related campaigns to stop them riding commercial motorcycle-taxis [96]).

There is a rapidly growing literature on motorcycle taxi operations by young men (rarely are women involved, except as passengers), for example Burge on young male entrepreneurs in Sierra Leone, Olvera et al. on west and central African cities, and Jenkins and Peters on post-conflict Liberia [97–99]. An extensive review of the recent literature on this theme is now available [100]. It is important to note that motorcycle maintenance and repair is a growing support industry too, both for private and commercial motorcycles, but again mostly employs men.

6. Road Safety and Other Aspects of Young People's Personal Mobility Safety

6.1. Road Safety

The bare bones of the global road safety issue are clearly presented in a recent World Health Organisation (WHO) road traffic injuries factsheet [101]. This demonstrates that, while globally, people from lower socioeconomic backgrounds are more likely to be involved in road traffic crashes, more than 90% of road traffic deaths occur in LMICs and road traffic injury death rates are highest in the African region (at 26.6/100,000 people), followed by South-East Asia (20.7/100,000 people). Africa has the highest proportion of pedestrian and cyclist mortalities at 44% of deaths: unsurprisingly, pedestrians, cyclists and riders of two- and three-wheeler motorcycles are especially vulnerable as a result of being less protected than car occupants. However, vulnerable road users are still largely ignored in the planning, design and operation of roads. Across Africa and Asia, most roads still lack separate lanes for cyclists or adequate crossings for pedestrians, while motor vehicle speeds are too high [102].

So far as children and young people are concerned, the statistics are particularly sobering: road traffic injuries are the leading cause of death globally for the 5–29 years cohort. The vulnerability of younger children to road traffic relates to their physical, cognitive and social development stage compared to that of adults. Given their small stature, they may find it difficult to see surrounding traffic and for drivers, in particular, to see them. They are likely to have more difficulty judging the proximity, speed and direction of moving vehicles. Impulsivity and a shorter attention span could affect their ability to cope with simultaneous events. In a road traffic crash, their softer heads will make them more susceptible to serious head injury than an adult. Adolescents, meanwhile, are found to be especially prone to take risks that compromise their road safety [63].

In urban areas, most of those injured in public transport accidents are either paratransit passengers or pedestrians (commonly including young people trying to hawk goods between slow moving traffic). In Ilesa, south-west Nigeria, a small study of child accident victims found that the majority (89%) were pedestrians and most were over 5 years old; 60% of them were injured either while hawking by the roadside or when undertaking an errand [103]. Twenty per cent of cases involved motorcycles. This excludes potentially wider damage to young people's health in urban areas associated with vehicle-generated air pollution.

During interviews in the 24-site child-mobility study across Ghana, Malawi and South Africa, teachers were questioned about road safety education. Whatever national programmes exist, their evidence seems to suggest that many children in school obtain little quality road safety training [14] (chapter 8). This mirrors conditions across many LMICs, despite the level of traffic injuries sustained by children. However, efforts have been in progress in a number of countries to promote road safety, funded, for instance, by the UK Department for International Development (DFID) and the Danish International Development Agency (DANIDA) and, since 2012, through the International Automobile Federation (FIA) Road Safety Grants Programme. The FIA projects aim to meet the objectives of the UN Decade of Action for Road Safety (2011) of halving the number of deaths and injuries from road traffic accidents by 2020, with active programmes in diverse LMIC countries including Tanzania, Nigeria, Brazil, Morocco and China [104].

Recent research in the Global North has drawn attention to the value of training parents about road safety [105] but in LMICs, where many children travel to school and other locations without parental accompaniment (see above), this is unlikely to have a significant impact. There, early training of children on pedestrian road safety is crucial. Salmon and Eckersley proposed that to become skilled pedestrians, children need to move ‘beyond a view of traffic as rule-bound and develop dynamic adaptable strategies for crossing roads’ [106] (p. 729). The reportedly successful local programme they developed in Ethiopia, based on the UK *Kerbkraft* concept, entailed practical exercises on local streets, enabling children to develop techniques for identifying safe crossing-places. FIA foundation projects such as South Africa’s Safe Schools project take a similar approach [107]. A recent project by the Non-Governmental Organisation (NGO) Amend in a Lusaka school that includes addition of a raised platform pedestrian crossing, footpaths, fencing and a school zone warning, removal of vehicle parking which blocked sight lines, and reduced operating speeds of passing vehicles, has reportedly had significant impact [108]. Other examples show how high the returns from such investment can be: in Korea a school zoning scheme, together with improved school bus regulation and road safety training schemes, reportedly reduced traffic accidents among children under 14 years of age by 95% between 1998 and 2012 [101]. However, finding means to bring road safety training to the many children who either never attend school or leave before the year in which road safety training is introduced, is also vital [109]. Here, road safety NGO interventions that support short courses for groups such as young traders (at particular risk as they rush to vehicles to sell, darting across roads and within the path of other vehicles) would be extremely valuable [14] (chapter 8).

Motorised traffic is also a growing danger for those who operate it or travel in it. In Cambodia, Kitamura et al. argued that speeding by young people is promoted by road improvements that occur alongside underdeveloped traffic legislation and limited public awareness and knowledge of road safety [110]. They emphasise the importance of implementing the “three Es”, namely Engineering, Enforcement and Education in low income countries such as Cambodia but note that the role of education to increase people’s road safety awareness is neglected compared to the other two dimensions. Across LMICs in Africa and Asia, there are widespread issues associated with poorly regulated (privately operated) public transport, limited vehicle maintenance, deficiencies in law enforcement, high traffic mix and little separation of vulnerable road users from high speed motorized traffic. When coupled with the lack of seat belts, overcrowding/standing passengers, poor road infrastructure and, overall, very hazardous road environments, it is clear that the conditions in which young people navigate the city are often potentially lethal. The dangerous practice of transporting passengers in the cargo area of light delivery vehicles (LDVs) also occurs in many countries: one small study in South Africa found that 35% of passengers treated for injury following ejection from the vehicle were children under the age of 18 (and 11% sustained a permanent disability) [111].

Much recent attention has been paid to the high level of traffic injury associated with motorcycles (mostly driven by young men). Problems associated with a lack of adequate body and head protection (given that helmets are uncomfortable in high temperatures and often of sub-standard manufacture), poorly regulated vehicle and driver safety and the preponderance of young male drivers with a taste

for speed, are exacerbated when two, three or more passengers are riding pillion. Phone use when operating a vehicle adds to these hazards [112]. Air pollution from motorcycles is also a growing issue in densely populated urban areas, especially in Asia.

Finally, it is important to note that where gender-disaggregated data are available, road injury patterns show a significant gender dimension, with nearly three quarters (73%) of all road traffic deaths occurring among males under the age of 25 years: they are almost three times as likely to be killed in a road traffic crash as young females [101,113,114]. Unfortunately, in LMICs in Asia and Africa, adequate gender-disaggregated data are still regularly missing from road safety studies. This is likely to be partly a factor of overall poor reportage of road injury by accident victims, their families and carers, the police and hospitals [102]. One review of published and grey literature on road traffic injury in urban sub-Saharan Africa among young people (≤ 19 years) suggested that boys and young men were twice as likely to be involved as girls and young women [115]. A recent study of primary school pupils in low-income neighbourhoods in Cape Town found that older boys (10–15 years) were most at risk of experiencing a severe pedestrian injury [116]. In India, data for 2014–2016 show that females represented only around 15% of road accident victims [117]. Gender imbalance in RTIs in LMICs, as globally, appears to be associated not only with higher male access to and use of road transport and higher male mobility overall, but also to gender variations in attitude to risk.

6.2. Travel Safety and Security

Beyond road traffic accidents, travel safety and security is often regarded as primarily an issue affecting females. There is certainly substantial evidence regarding high perceptions of travel danger (from verbal harassment to rape and murder) among girls and young women across the globe. There is also ample evidence of actual harassment of women globally and on a daily basis, with recent statistics suggesting, for instance, that over 70% of women in Karachi had experienced harassment on public transport and 90% in Sri Lanka, while 89% of women in Santiago had either seen or experienced it themselves [83] (pp. 15–16). Participants in a Chennai research study reported 14 years as the mean age at which they first encountered harassment in travel contexts; harassment was worst at night [118]. Jeffrey similarly reported so-called ‘eve-teasing’ in India [74]. This is rarely reported to the police and, as Anand and Tiwari noted for a Delhi slum [84] and Salon and Gulyani for a Nairobi slum [43], results in women travelling far less than they might otherwise do, thus contributing to their economic and social exclusion.

Lack of reportage means that it is difficult to assess the age-distributed incidence (or impact) of sexual harassment. Women worldwide have reported street harassment even in their 80s [119], so this is not purely an issue for youth. The statistics cited above are for women per se, but young girls may well be at particularly high risk of harassment and are even less likely to report such actions so their situation is often particularly dire. Young girls interviewed in the 24-site study in Ghana, Malawi and South Africa confided (especially to the peer researchers) a range of problems from catcalling and jeering by men to being groped when on public transport and actual rape [14] (pp. 184–186), [120]. Especially in locations with high HIV/AIDS prevalence, rape is clearly life-threatening. Girls’ fear of travelling alone often leads them to postpone travel until others can accompany them (travel in groups is usually preferred by them and their parents), to take longer journeys to avoid particular trouble spots or to simply not travel, especially during hours of darkness [14,121] (for urban South Africa). However, it is important to note that boys can also face significant harassment, intimidation and, albeit very rarely, rape as they travel [14,122] (pp. 186–187).

7. Mobile Technology: Interactions between Mobile Technology and Travel among Young People

Young people tend to be at the forefront in uptake and use of digital technology across the world. Consequently, there is already substantial evidence of their engagement with mobile technology—mobile phones, the internet and other information and communication technologies (ICTs)—in transport contexts, not least as an aid to help address transport poverty. E-learning and

mHealth are expanding rapidly, while smart mobility and smart city solutions are now becoming central foci of urban planning research globally. In remote rural areas, the potential for e-connectivity to reduce transport poverty can be particularly powerful [123,124]. In LMICs, where low cost mobile phone handsets and mobile phone networks have expanded dramatically over the last two decades, the implications for travel practices are extremely significant, as a growing literature attests (for example, Porter on the implications for poorer people's mobility [125], Williams et al. 2015 on the Nairobi digital matatu project [126]). When emergencies arise—not least obstetric emergencies among first time and very young mothers (who are at particularly high risk)—mobile-enabled mobility (whereby a phone-call to the nearest health centre brings in an ambulance) can be life-saving [127]. One issue worthy of note, however, is the varying cost of airtime and data. In countries with a highly competitive ICT sector, such as Kenya, airtime and data are relatively cheap, but in others, including South Africa, running a mobile phone, especially a smart phone, is costly. For young people with limited resources, this is an issue of considerable significance, although two studies conducted with African youth indicated that many young people see these costs as a priority over other consumables and often make considerable sacrifices in order to maintain their access [128–130].

The published literature specifically concerned with *youth* use of phones in daily travel contexts (as opposed to migration contexts) is, to date, relatively sparse globally, although there is a large amount of literature on phone practices based around youth culture and social media, adult or partner surveillance, etc. Nonetheless, there is growing evidence in the Global North of young people embedding technology in their everyday lives to better accommodate the uncertainty in activity and travel scheduling, such that it 'lubricates' modern life without fundamentally changing travel behaviours [131]. In the Global South, technology may have more impact on travel behaviour. The extent to which mobile phones can reduce travel is a particularly important question with regard to resource-poor people and environments and to carbon reduction, especially in urban contexts. Qualitative and survey data regarding young people's perception of the extent to which their use of phones had substituted for travel in the previous year, conducted in 24 sites in Africa, suggests that some reductions in travel are occurring, although the precise patterning varies with location [132–134].

In urban South Africa, many short daily journeys conducted by both males and females, especially walking journeys, seem to be being substituted by phone calls with safety as the main reason behind this. There is also evidence of a perceived reduction in longer (more expensive) journeys by motor vehicle as a result of greater mobile phone usage: in this case, the change is probably mostly attributable to the potential for saving money (although safety considerations could come into play too, given the hazards of long distance travel in the continent) [121]. Among urban residents, perceived reductions in long distance, irregular, and short everyday journeys look substantial, but it is important to note that these are only assessments based on respondent reflections about their travel activities over the past year. Whether this a real change, and if so, whether it is one that has reduced pedestrian and motorised traffic flows in the neighbourhoods where the surveys were conducted—and, if so, with what consequences for health and security—would be worthy of further research.

ICT/transport connectivities can be particularly important for women. As noted earlier, many women and girls in LMICs are restricted in their physical travel by male family members who may not only express concern for the vulnerability of womenfolk travelling alone but also distrust the potential that independent female mobility offers for promiscuity. In such contexts, women's access to mobile phones can be seen as a potential (virtual) mobility aid. However, keeping control of a partner's mobile phone communication is now a regular male endeavour in many households (as Burrell observed for rural Uganda [135]). As handset prices drop and phone ownership increases among young women, this is becoming more difficult to maintain, but surveillance of wives' and girlfriends' phone contact lists and calls and use of the phone as a 'digital leash' to check their physical location and travel movements appear to be growing features of many relationships [136,137]. In this context, it is noteworthy that young men in the motor-cycle taxi business and older 'sugar daddy' male

taxi drivers have become notorious in some locations for using their relative wealth built through transport operations to buy phones for their girlfriends [121].

For (mostly male) transport operators, owning a working phone is widely considered essential to running a successful business; this is even the case for bicycle-taxi operators in Malawi [133]. Across Africa, people of all ages keep the numbers of local motorcycle-taxi and taxi drivers on their phones (ibid). For young women in particular, this is often seen not merely as a convenience but as a vital informal safety mechanism [121].

Beyond the transport sector per se, informal use of mobile devices appears to be having some impact on youth entrepreneurship through leapfrogging physical distance and promoting social networking. Qualitative and survey data on phone use for business among young people in 24 African research sites indicate that the phone is used extensively and intensively in small informal businesses. In trade, it is used not only to build relationships with customers and suppliers but also to help with pre-arranging meetings, organising travel, finding staff and for mobile money transfers and ensuring that payments have been made [121]. However, it could be unwise to overrate the phone's potential to promote youth entrepreneurship [138]. In Kibera, one of Nairobi's slum areas, although phones are utilised by young people to ease communication and strengthen existent social ties, this does not necessarily allow them to bypass Kenya's hierarchical class-based society [139].

New Forms of ICT-Enabled Mobility Service

While mobile phone usage will continue to be interwoven in diverse ways with human corporeal mobility and with physical transport technologies in LMICs, these patterns of interweaving are constantly being re-shaped. A burgeoning array of inventive phone apps, closely tied to growing smartphone use and the development of wireless infrastructure, appears to have particularly significant potential. In Asia, where the ride-hailing app boom is currently massive, smartphones are now available cheaply; advanced fourth-generation services can be accessed for just a few dollars. In Phnom Penh, for instance, at least four services, including one named CamGo, have been launched recently. This is for tuk-tuks, which are cheap but whose popularity was somewhat marred by drivers charging unreasonably high fares or intentionally taking round-about routes to increase the fare. CamGo is reportedly popular with young people because it offers a fixed rate per km and the route takes the shortest distance to the destination, measured by GPS, confirmed before boarding. Other recent examples include Chiang Mai, northern Thailand, where the Indonesian company Grab has launched a ride-hailing service for minibuses, now with 300 registered drivers. Ride-hailing services are also being used to book home deliveries. In India, Jugnoo, a ride-hailing service specializing in motorized tricycles, has partnered with fast-food restaurants such as Kentucky Fried Chicken and Burger King to deliver meals: it reportedly has 15,000 vehicles operating in 35 cities. We can anticipate that young people—both as customers and operators—will lead in the usage of these apps, although the returns from ownership of the vehicles involved may well go mostly to older, more established entrepreneurs [140].

In Africa, Uber and Uber-style apps are now playing a similar role. In South Africa, for instance, Uber has operated in major cities since 2013, although not without considerable hostility from metered taxi companies [141]. Subsequently, in 2017, the South Africa Meter Taxi Association set up their own app, "Yookoo Rider". This benefits customers through the registration of cab drivers, comprehensive driver vetting and criminal checks with fingerprint technology [141].

Uber-style companies now operate in many Africa cities (including for motorcycle taxis in cities like Kampala). With Little Cab, a Kenyan ride-hailing app backed by telecoms operator Safaricom, customers can pay for their ride through Safaricom's mobile money service, M-Pesa, buy discounted airtime during the trip and access free Wi-Fi. It also lets women exclusively request female drivers from 18:00 to 6:00 for safety reasons [142]. Many smaller operations are now attracting young entrepreneurs—for instance, the mobile application, Tag Your Ride, was launched by a young South African university graduate [142]. Young women customers appear to derive very considerable benefits

from these apps, as can women drivers, especially if they are able to build a women-only service. Finally, however, it is necessary to refer back to the potential of phones as a causal factor in transport accidents with potential for impact on all sectors of the population.

8. Concluding Summary and Reflections

This paper covered diverse aspects of mobility while taking a specific child and youth perspective and drawing on the voices and evidence of young people themselves. It has emphasised how travel experiences, needs and risks are embedded in power relations and vary with gender, age and location (urban versus rural, rich country versus poor country, Asia versus Africa). It has also pointed to the scale and range of uncertainties that so many young people now face as they negotiate daily mobility (or immobility). Neoliberal economic and social changes have been radically transforming young people's experiences of youth and early adulthood across much of the world over the last decade [143], while climate change and growing environmental fragility are beginning to bring further uncertainties to the fore. In this context, it is important to note that while the majority of emphasis in the literature reviewed has been on daily mobility or immobility and travel experiences, the implication of such daily mobility experiences (physical and virtual) for migration decisions (short and long distance, short and long term) needs far stronger attention, particularly in this era of climate change. The linkages between daily mobility experiences and migration decisions will need far closer investigation globally, but especially in the context of conflict, climate change and growing environmental fragility in many LMICs.

The review pointed to other clear research gaps too: in particular, the need for a realignment of research methods and associated practices. Of prime importance is the need for more in-depth research, particularly in Asia. There is a growing body of detailed evidence regarding children and young people's specific transport and mobility needs and experiences in sub-Saharan Africa, often taking an ethnographic approach, but as this review has demonstrated, data remain sparse (and primarily quantitative) in Asian and Middle East and North Africa (MENA) contexts. But whatever the place context, it is important that mixed methods studies and an interdisciplinary approach are adopted in order to capture a fuller understanding of young people's complex transport needs and constraints. To date, there has been a particular sparsity of research using mixed-methods approaches: the 24-site study of daily mobilities among young people 9–18 years in sub-Saharan Africa [14] seems, to date, to be the only extensive study in LMICs that utilised a range of qualitative and quantitative methods. In Asia, mixed methods studies are rare and a majority of research takes a quantitative survey approach that commonly fails to provide adequate understanding of the patterns that emerge. A triangulation of in-depth ethnographic and survey research drawing on a range of disciplinary skills (possibly coupled with action research where interventions are made, and their impact then studied in depth), can be particularly powerful in understanding mobility experiences, behaviours and opportunities for positive change.

Linked to this point, greater engagement with young people themselves in research and planning processes is essential. Community peer-research with young people as a route to more fully understanding their needs and aspirations in the transport field is gaining growing attention. The mixed-method study cited above, which brought together 70 young researchers (11–19 years) in Africa to help build an extensive academic study, demonstrated the value of this approach. Small studies in Asia and Africa further support the importance of directly engaging young people in the research process [12,17]. At the same time, however, there is also need to build stronger recognition among transport professionals of the value of inputs from more vulnerable groups. There is no point in conducting research with young people if the evidence collected is subsequently ignored. Thus, greater effort is required to draw transport professionals more centrally into the research process with vulnerable groups.

Action research incorporating and assessing both transport service and infrastructure interventions could considerably aid exploration of a diversity of issues in both LMIC cities and rural areas. In LMIC

cities, this could include working with young people to pilot and monitor interventions associated with road safety and improving potential for active travel: for instance, walking buses and other interventions such as street lighting and dedicated pedestrian and cycle lanes, as well as safe travel skills training for young women. Given the growing obesity problems among middle-class children in LMICs, particular attention also needs to be paid to improving their active travel to school. Meanwhile, for young people who may have never attended school and thus never had access to any road safety curriculum, piloting of non-school based road safety training interventions could bring great benefit—notably for the many involved in dangerous roadside hawking on busy city streets. In LMIC rural areas, there would be similar value in exploring the potential of walking buses, cycling and cycle maintenance/repair training, especially for girls, dedicated contract transport, and other interventions to improve girls' journey to school and to work. In both urban and rural contexts, new approaches to transport subsidy need exploring (and piloting) that do not result in excluding young people from transport (as has occurred when operators on busy routes have to choose between paying and non-paying customers). Subsidy is contentious in the transport services arena but could significantly improve the mobility opportunities and life chances of pupils, unemployed youth and young workers in urban and rural contexts.

Moving more centrally into the employment sphere, the transport/mobility elements that help shape youth employment, job search, entrepreneurship and unemployment experiences have, as yet, been insufficiently researched. This needs urgent attention across LMIC peri-urban sites, in particular where so many poorer households are located—and not least with specific reference to young women. More research is also needed around mobility aspects of out-of-school activities associated with recreation and social network building, which will be important for overall well-being but also may aid youth employment opportunities. Linked to this, more attention will be required to relationality across age groups (especially the linkages between expanded older people and youth cohorts) and the mobility implications that may extend well beyond work and employment.

Another area for further attention is how mobile technology is reshaping travel practices in low income contexts in the Global South (but also with likely relevance to some poor Global North communities). This includes the potential of mobile technology to reduce motorised transport usage and the extent to which young people may experience negative elements of exploitation or surveillance through digital technology. Mobile technology now helps young people to extend their networks across the world and has potential to support distance management in both emergency and everyday travel contexts and in rural and urban places. The potential for apps (including those developed by young people themselves) to reshape the transport arena globally is very exciting and opens up a potentially dramatic new phase of development. However, the extent to which less powerful groups in society, especially young people, are able to benefit in the longer term while evading potential threats of exploitation (for instance in the gig economy) or the wider surveillance and control also posed by increasingly smart technological innovation is uncertain; the evolving scene will merit careful observation.

Finally, it is important to look beyond the transport sector if we are to make significant improvements in young people's travel experiences and opportunities. Regarding LMICs, far greater attention is needed to youth transport issues from development practitioners working in other sectors outside transport, particularly education, youth employment, ICT and energy (although recent moves in the health sector to incorporate both transport and ICT considerations in their analyses are very encouraging). This will require more sustained efforts among transport practitioners and researchers to reach cross-sectorally and engage productively with those sectors if youth opportunities that are so central to achieving progress across the SDGs are to be fully realised.

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